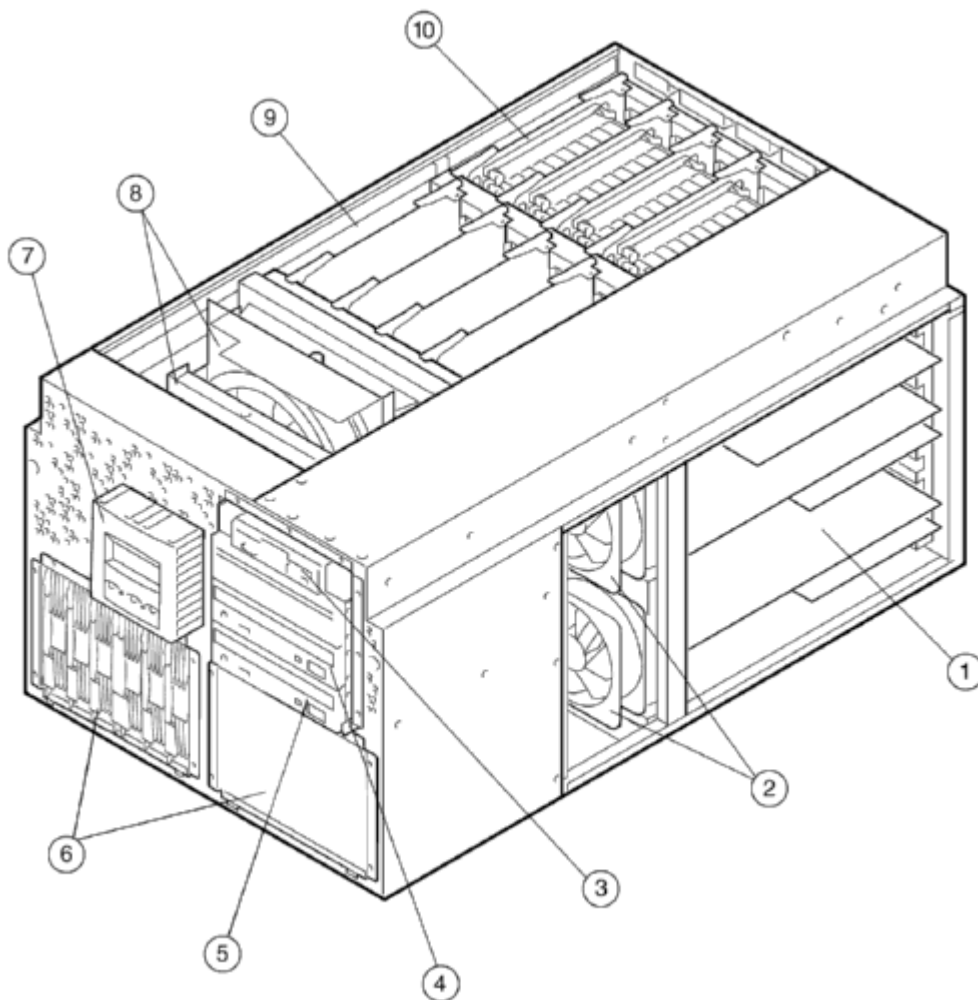


## Overview



1. PCI Cards

2. Fans

3. Diskette drive

4. Removable media bays

5. DVD-ROM drive

6. 6-Bay disk drive storage cages

7. Control Panel

8. Fans

9. CPUs

10. Memory

## Overview

### At A Glance

AlphaServer ES45 Systems include:

- Alpha 21264C 68/1250-MHz CPU with 16-MB L2 Dual Data Rate Cache
- Six 64-bit PCI I/O expansion slots for Model 1B plus one AGP 4X graphics slot
- Ten 64-bit PCI I/O expansion slots for Models 2B and 3B
- Up to four PCI buses

#### Model 1B

- Two 64-bit/66-MHz PCI buses
- One 64-bit/33-MHz PCI bus
- One AGP 4X bus

#### Model 2B

- Three 64-bit/66-MHz PCI buses
- One 64-bit/33-MHz PCI bus

#### Model 3B

- One 64-bit/66-MHz PCI bus
- Three 64-bit/33-MHz PCI buses
- Up to 32-GB memory using 512-MB, 1-GB, 2-GB, or 4-GB memory options
- 1.44-MB diskette drive
- 16X DVD-ROM drive
- Two 9-pin serial ports
- One 25-pin parallel port
- Remote Management Console (RMC) – dedicated serial port, 6-pin MMJ connector
- Keyboard and mouse port
- Knockouts for two additional 68-pin external SCSI connections
- One power supply
- Integral remote system management console
- Customer documentation
- Tru64UNIX or OpenVMS Factory Installed Software
- Protected by HP Services, including one-year hardware warranty, on-site with 5 x 9 next business day response.

## Standard Features

Processor	Alpha 21264C 68/1250-MHz CPU	
Cache Memory	8-MB (1 GHz) or 16-MB (1.25 GHz) L2 Dual Data Rate Backup Cache	
Upgradability	Supports additional processors and upgrades of memory and hard drives	
Memory	Minimum	1 GB – AlphaServer ES45
	Maximum	16 GB (16 DIMM slots) - Model 1B 32 GB (32 DIMM slots) - Model 2B or Model 3B
Network Controller	Choice of Ethernet controllers	
Expansion	PCI I/O slots	Up to ten PCI slots – See PCI Configuration Guidelines
Storage	Diskette Drive	1.44-MB diskette drive in dedicated slot
	DVD-ROM Drive	16X DVD-ROM drive
	Hard Drives	Choice of 36.4-GB, 72.8-GB, 146-GB or 300-GB drives
Interfaces	Parallel	One 25-pin parallel port
	Serial	Two 9-pin serial ports
	Keyboard	One port
	Mouse	One port
	Remote Management Console port (RMC)	One 6-pin MMJ dedicated port
	SCSI connections	Knockouts for two additional 68-pin external SCSI connections
Graphics	Optional	
Form Factor	Tower	Up to 12 Universal disk drives
	Pedestal	Up to 40 Universal disk drives
	Rackmount	Up to 152 Universal disk drives
Power Supply	One auto-sensing power supply, hot swappable, N+1, power factor corrected	
Manageability	Insight Manager	

Standard Features

OS Support	AlphaServer ES45 Tru64 UNIX systems include pre-installed software, Base license, Unlimited User license, Server Extension license, Internet Express, and Secure Web Server AlphaServer ES45 OpenVMS systems include pre-installed software, Base license with System Manager license and Enterprise Integration Server License Package for OpenVMS Minimum OS support - Tru64 UNIX V5.1A or OpenVMS V7.3
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Service and Support	Protected by HP Services including a one-year on-site hardware warranty with next business day response. Training, consulting, network integration, software support, comprehensive system maintenance and guaranteed uptime services are also available for customers requiring higher levels of service and support. AlphaServer ES45 systems are available in the following models or configurations: <ul style="list-style-type: none"><li>Model 1B (1.25 GHz)</li><li>Model 2B (1.25 GHz)</li><li>Model 3B (1.25 GHz)</li></ul>
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When configuring an AlphaServer ES45 system, refer to the following chart that summarizes the features of each model as well as the differences between each model.

AlphaServer ES45 Model Summary	Model 1B (1.25 GHz)	Model 2B (1.25 GHz)	Model 3B (1.25 GHz)
I/O Slots	7	10	10
- 33-MHz PCI Slots	2	4	8
- 66-MHz PCI Slots	4	6	2
- 4X AGP Slots	1	0	0
Power Supplies (Minimum/Maximum)	1-3	1-3	1-3
Power Supply (DC Watts) One included – maximum three power supplies per system	3X-H7514-AA	3X-H7514-AA	3X-H7514-AA
	1080 Watts	1080 Watts	1080 Watts
Memory (Minimum/Maximum)	1 GB – 16 GB	1 GB – 32 GB	1 GB – 32 GB
Memory Option (4-GB Option)	MS620-DB	MS620-DB	MS620-DB
	Higher Power DIMM	Higher Power DIMM	Higher Power DIMM
Memory Channel I/O Space (CCMAB-AA) See Memory Channel – Step 9	128K	128K	512K or 128K

**NOTE:** Minimum firmware for 1.25-GHz systems is V6.2-8, minimum SROM firmware is V2.22-F. Firmware files are available at: <http://ftp.digital.com/pub/Digital/Alpha/firmware/interim/es45/v6.2C/>

## Standard Features

### PCI Configuration Guidelines

- Modules designed for 5.0 V signaling and 33-MHz bus speed can only operate in 5.0 V/33-MHz slots
- Modules designed for 3.3 V signaling and 66-MHz bus speed can only operate in 66-MHz slots
- Universal PCI modules can operate in all slots (3.3 V and 5.0 V)
- Universal PCI modules operating at 33 MHz placed in a 66-MHz slot will reduce the entire hose to operate at 33 MHz
- Universal PCI modules capable of operating at 66 MHz when placed in a 33-MHz slot will operate at 33 MHz

### PCI Module Descriptions:

- PCI modules listed in this document as 33 MHz or 66 MHz refer to the module's maximum PCI bus speed.
- Modules that can only operate at 5 V are designated as 5 V – 33-MHz modules.
- Universal PCI modules are designated as 3.3/5 V and can be installed into 33-MHz or 66-MHz slots.

AlphaServer ES45 systems provide four I/O hoses, each is configured differently as illustrated in the following charts for Models 1B, 2B, and 3B.

AlphaServer ES45 PCI bus and slot specification for Model 1B follows:

PCI Slot	PCI Bus Speed	Signal Voltage	PCI Hose Number
1	33 MHz	5.0 V	0
2	33 MHz	5.0 V	0
3	AGP 4X	1.5 V	2
4	66 MHz	3.3 V	3
5	66 MHz	3.3 V	3
6	-	-	-
7	66 MHz	3.3 V	1
8	66 MHz	3.3 V	1

AlphaServer ES45 PCI bus and slot specification for Model 2B follows:

PCI Slot	PCI Bus Speed	Signal Voltage	PCI Hose Number
1	66 MHz	3.3 V	2
2	66 MHz	3.3 V	2
3	33 MHz	5.0 V	0
4	66 MHz	3.3 V	3
5	66 MHz	3.3 V	3
6	33 MHz	5.0 V	0
7	66 MHz	3.3 V	1
8	66 MHz	3.3 V	1
9	33 MHz	5.0 V	0
10	33 MHz	5.0 V	0

AlphaServer ES45 PCI bus and slot specification for Model 3B follows:

PCI Slot	PCI Bus Speed	Signal Voltage	PCI Hose Number
1	33 MHz	5.0 V	2
2	33 MHz	5.0 V	2
3	33 MHz	5.0 V	0
4	66 MHz	3.3 V	3
5	66 MHz	3.3 V	3

Standard Features

6	33 MHz	5.0 V	0
7	33 MHz	5.0 V	1
8	33 MHz	5.0 V	1
9	33 MHz	5.0 V	0
10	33 MHz	5.0 V	0

## Systems

### Step 1 – Select system

AlphaServer ES45 Model 1B, Model 2B, and Model 3B Systems require the mandatory selection of the following items. AlphaServer ES45 Base Systems require the selection of a minimum of 1-GB memory in addition to the following mandatory items.

- Disk drive cage or StorageWorks shelf (Step 5)
- System disk drive (Step 5)
- Tower, Pedestal, or Rack Kit (Step 6)
- Ethernet adapter (Step 8)
- Storage adapter (Step 10)
- Order country-specific keyboard and mouse only if required (Step 14)
- Software media and documentation for first system onsite (Step 16)

**NOTE:** Only 2-5-2 part numbers are factory integrated.

#### AlphaServer ES45 Systems (1250 MHz)

ES45	OS	CPU	PCI I/O Slots	Memory/Cache	Order Number
Model 1B	Tru64 UNIX	1250 MHz	6 PCI, 1 AGP 4X	1 GB/16 MB	DA-66EBA-BA
Model 1B	Tru64 UNIX	1250 MHz	6 PCI, 1 AGP 4X	2 GB/16 MB	DA-66EBA-CA
Model 1B	Tru64 UNIX	1250 MHz	6 PCI, 1 AGP 4X	4 GB/16 MB	DA-66EBA-DA
Model 1B	OpenVMS	1250 MHz	6 PCI, 1 AGP 4X	1 GB/16 MB	DY-66EBA-BA
Model 1B	OpenVMS	1250 MHz	6 PCI, 1 AGP 4X	2 GB/16 MB	DY-66EBA-CA
Model 1B	OpenVMS	1250 MHz	6 PCI, 1 AGP 4X	4 GB/16 MB	DY-66EBA-DA
Model 2B	Tru64 UNIX	1250 MHz	10 PCI	1 GB/16 MB	DA-68EBA-BA
Model 2B	Tru64 UNIX	1250 MHz	10 PCI	2 GB/16 MB	DA-68EBA-CA
Model 2B	Tru64 UNIX	1250 MHz	10 PCI	4 GB/16 MB	DA-68EBA-DA
Model 2B	OpenVMS	1250 MHz	10 PCI	1 GB/16 MB	DY-68EBA-BA
Model 2B	OpenVMS	1250 MHz	10 PCI	2 GB/16 MB	DY-68EBA-CA
Model 2B	OpenVMS	1250 MHz	10 PCI	4 GB/16 MB	DY-68EBA-DA
Model 3B	Tru64 UNIX	1250 MHz	10 PCI	1 GB/16 MB	DA-67EBA-BA
Model 3B	Tru64 UNIX	1250 MHz	10 PCI	2 GB/16 MB	DA-67EBA-CA
Model 3B	Tru64 UNIX	1250 MHz	10 PCI	4 GB/16 MB	DA-67EBA-DA
Model 3B	OpenVMS	1250 MHz	10 PCI	1 GB/16 MB	DY-67EBA-BA
Model 3B	OpenVMS	1250 MHz	10 PCI	2 GB/16 MB	DY-67EBA-CA
Model 3B	OpenVMS	1250 MHz	10 PCI	4 GB/16 MB	DY-67EBA-DA

## Systems

### AlphaServer ES45 Base Systems (1250 MHz)

**NOTE:** Selection of a minimum of 1-GB memory is mandatory for AlphaServer ES45 Base systems.

ES45	OS	CPU	PCI I/O Slots	Order Number
Model 1B	Tru64 UNIX	1250 MHz/16 MB	6 PCI, 1 AGP 4X	DA-66EBA-AA
Model 1B	OpenVMS	1250 MHz/16 MB	6 PCI, 1 AGP 4X	DY-66EBA-AA
Model 2B	Tru64 UNIX	1250 MHz/16 MB	10 PCI	DA-68EBA-AA
Model 2B	OpenVMS	1250 MHz/16 MB	10 PCI	DY-68EBA-AA
Model 3B	Tru64 UNIX	1250 MHz/16 MB	10 PCI	DA-67EBA-AA
Model 3B	OpenVMS	1250 MHz/16 MB	10 PCI	DY-67EBA-AA

### Step 2 - Additional CPU Modules - Optional

- One CPU included, three additional CPUs are supported

SMP upgrade, includes one 68/1000-MHz CPU with 8-MB cache and Tru64 UNIX SMP license KN610-DB

SMP upgrade, includes one 68/1000-MHz CPU with 8-MB cache and OpenVMS SMP license KN610-DC

SMP upgrade, includes one 68/1250-MHz CPU with 16-MB cache and Tru64 UNIX SMP license KN610-EB

SMP upgrade, includes one 68/1250-MHz CPU with 16-MB cache and OpenVMS SMP license KN610-EC

**NOTE:** Minimum firmware for 1.25-GHz systems is V6.2-8, minimum SROM firmware is V2.22-F. Firmware files are available at:

<http://ftp.digital.com/pub/Digital/Alpha/firmware/interim/es45/v6.2C/>

**NOTE:** Existing AlphaServer ES45 1-GHz Model 2 (xx-68DAA-xx) customers who upgrade to 1.25-GHz CPUs should continue to follow Model 2 configuration guidelines. The following options are required: H7906-A9 power supply and MS620-AA, MS620-BA, and MS620-CA memory options. Do not order 3X-H7514-AA power supplies or MS5620-DB memory options.



Systems

Step 3 - Memory - Optional

- Base systems do not include memory; select a minimum of 1-GB memory; this is a mandatory selection. All other systems include one memory option.
  - Maximum four memory options (total of 16 DIMMs) for Model 1B (one per array)
  - Maximum eight memory options (total of 32 DIMMs) for Model 2B and Model 3B (two per array)
  - AlphaServer ES45 system includes two memory buses
  - AlphaServer ES45 system includes two arrays per bus
  - For Model 2B and Model 3B, memory options within an array must be identical
    - 512-MB memory option (4 x 128-MB DIMMs)MS620-AA
    - 1-GB memory option (4 x 256-MB DIMMs)MS620-BA
    - 2-GB memory option (4 x 512-MB DIMMs)MS620-CA
    - 4-GB memory option (4 x 1024-MB DIMMs)MS620-DB
- NOTE:** Do not order MS620-DB memory option for installation in ES45 1-GHz Model 2 (xx-68DAA-xx) system. MS620-DB memory option can only be installed in (xx-6xDBA-xx) and (xx-6xEBA-xx) systems.

Memory performance considerations:

- The AlphaServer ES45 system has two memory buses. When two or more memory options are installed, both buses are utilized, enhancing system performance.
- The AlphaServer ES45 system has two arrays per bus. Interleaved operations reduce the average latency and increase the memory throughput. When all four arrays are populated with the same amount of memory, read-write operations are four-way interleaved, enhancing system performance.

The following examples illustrate different ways of configuring a 4-GB system. Case C yields the best performance and is the recommended method for configuring memory on an AlphaServer ES45 system.

ES45 System (one memory option included)	Add-on Memory Options	Total Memory	Total DIMMs	Performance
Case A - DA-68EBA-DA (MS620-DB)	None	4-GB	4	Good
Case B - DA-68EBA-CA (MS620-CA)	MS620-CA	4-GB	8	Better
Case C - DA-68EBA-BA (MS620-BA)	MS620-BA + MS620-BA + MS620-BA	4-GB	16	Best*

\* **NOTE:** Operating system and application dependent. Up to an 18% performance enhancement has been measured in Case C over Case A.

Options

Step 4 - Additional Power Supply - Optional

One Power Supply	Standard with Model 1B, 2B, and 3B systems; provides system support for: <ul style="list-style-type: none"><li>• Two CPUs</li><li>• One disk drive cage (up to six disk drives)</li><li>• Four memory options (up to 16 DIMMs)</li></ul>
Two Power Supplies	Optional – Provides system support for: <ul style="list-style-type: none"><li>• Four CPUs</li><li>• Two disk drive cages (up to 12 disk drives)</li><li>• Eight memory Options (up to 32 DIMMs)</li></ul>
Third Power Supply	Optional - Provides (N+ 1) power redundancy system support for two power supply configuration

- Additional power supply ordered with a tower system requires an additional country-specific power cord
- Pedestal system and Rack kit include three internal IEC/IEC power cords (for internal connection to power distribution unit or power strip) regardless of the number of power supplies ordered

ES45 1080 W power supply; order for Models 1B, 2B, and 3B (1-GHz) and Models 1B, 2B, and 3B (1.25-GHz) systems only; do not order for Model 2 (xx-68DAA-xx) systems.	3X-H7514-AA
ES45 720 W power supply; order for Model 2 (1-GHz xx-68DAA-xx) systems only.	H7906-A9

Step 5 - Disk Drive Cage, Universal Drive Shelf, or Universal Disk Drive - Mandatory

- Each system supports up to two disk drive cages
- Each disk drive cage supports six 1-inch Universal disk drives
- StorageWorks 43xx shelves support up to 14 Universal disk drives
- Pedestal enclosure supports one system and two disk drive cages, two Universal 43xx StorageWorks shelves
- M-Series and Series 10000 cabinets support up to five systems or one system with up to ten StorageWorks shelves

Step 5a - Disk Drive Cage - Requires selection of system disk drive

Disk drive cage with storage cable accommodates up to six internal 1-inch Universal disk drives – Requires mandatory selection of a Storage Adapter in the system. Requires an internal Ultra2 SCSI or Ultra3 SCSI channel per disk drive cage. Maximum of two storage cages in system. <b>NOTE:</b> See <a href="#">ES45 Configuration Chart for Storage Adapters in Step 10.</a>	BA610-6D
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## Options

Universal Disk Drives (Supported in Disk Drive Cage and Universal StorageWorks Shelves)	36.4-GB Ultra320 SCSI 15,000 rpm 1-inch Universal disk drive	3R-A3849-AA
	72.8-GB Ultra320 SCSI 10,000 rpm 1-inch Universal disk drive	3R-A3839-AA
	72.8-GB Ultra320 SCSI 15,000 rpm 1-inch Universal disk drive	3R-A3851-AA
	146-GB Ultra320 SCSI 10,000 rpm 1-inch Universal disk drive	3R-A3841-AA
	146-GB Ultra320 SCSI 15,000 rpm 1-inch Universal disk drive	3R-A4945-AA
	300-GB Ultra320 SCSI 10,000 rpm 1-inch Universal disk drive	3R-A4952-AA
	300-GB Ultra320 SCSI 15,000 rpm 1-inch Universal disk drive	3R-A6726-AA

### Step 5b - StorageWorks Model 4314R and Model 4354R Universal Drive Shelves

- Up to two shelves in Pedestal form factor
- See Step 7 for rack configurations with M-Series and Series 10000 cabinets
- StorageWorks Model 4314R, 4314T and 4354R Ultra3 SCSI (LVD) single-bus and split-bus Universal drive shelves; refer to StorageWorks Enclosure 4300 Family QuickSpecs when configuring shelves. When selecting a DS-SL13R-xx split-bus shelf, two SCSI channels are required from selected storage adapters. BN38C-05 cable is required per channel if the connection is not VHDCI/VHDCI. DS-SL13R shelves include one 12-foot VHDCI/VHDCI SCSI cable.

StorageWorks Model 4314R Ultra3 SCSI (LVD) single-bus Universal drive rackmount shelf, includes one power supply, U.S.	DS-SL13R-AA
StorageWorks Model 4314R Ultra3 SCSI (LVD) single-bus Universal drive rackmount shelf, includes one power supply, Japan	DS-SL13R-AJ
StorageWorks Model 4354R Ultra3 SCSI (LVD) split-bus Universal drive rackmount shelf, includes two redundant power supplies, U.S.	DS-SL13R-BA
StorageWorks Model 4354R Ultra3 SCSI (LVD) split-bus Universal drive rackmount shelf, includes two redundant power supplies, Japan	DS-SL13R-BJ

### Step 5c - StorageWorks Modular Storage Array 30 (MSA30) Universal Drive Shelves

- Up to two shelves in Pedestal form factor
- See Step 7 for rack configurations with M-Series and Series 10000 cabinets
- StorageWorks Model 4414R and 4454R Ultra320 single-bus and split-bus Universal drive shelves; refer to StorageWorks Modular Storage Array 30 Family QuickSpecs when configuring shelves. When selecting a 3R-A4076-AA split-bus shelf, two SCSI channels are required from selected storage adapters. BN38C-05 cable is required per channel if the connection is not VHDCI/VHDCI.
- MSA30 shelves are not currently supported in SCSI cluster configurations
- For OpenVMS 7.3-2, DEC-AXPVMS-VMS732\_FIBRE\_SCSI-V0100-4.PCSI is required to support dual-port I/O module (287483-B21) and/or the MSA30DB dual bus enclosure (3R-A4076-AA) in an OpenVMS cluster environment
- Hardware to mount into a Series 10000 Cabinet is included. When mounting into an M-Series Cabinet or ES45 Pedestal Enclosure, a rail kit (3R-A5281-AA/313877-B21) must be ordered separately.

StorageWorks Modular Smart Array SW4414R Single Bus Ultra320 rackmountable SCSI disk drive, 4-node Storage Enclosure (302969-B21). Includes one 12-foot VHDCI/VHDCI SCSI cable and two IEC-C13 power cords. See Supported Options List for configuration details -- <a href="http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html">http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html</a>	3R-A4075-AA
StorageWorks Modular Smart Array SW4454R Dual Bus Ultra320 rackmountable SCSI disk drive, 4-node Storage Enclosure (302970-B21). Includes two 12-foot VHDCI/VHDCI SCSI cables and two IEC-C13 power cords. See Supported Options List for configuration details -- <a href="http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html">http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html</a>	3R-A4076-AA

Options

M-series Rack Rail Kit Option

3R-A5281AA/  
313877-B21

**NOTE:** The 3R-A4075-AA and 3R-A4076-AA enclosures are not supported in a shared-SCSI cluster using the 3X-KZPEA-DB adapter.

Step 6 - System Enclosures - Mandatory selection of Tower, Pedestal, Rack Kit, Power Cords

- All AlphaServer ES45 enclosures are carbon black
- Power cords are mandatory for tower and pedestal enclosures
- Power cords are included in Rack Kits

Step 6a – Tower Enclosure

- Tower enclosure supports one system
- Selection of one country-specific power cord is mandatory
- Additional power cord is mandatory if additional power supply is ordered.

200–240V Tower Enclosure

BA61M-CT

Step 6b – Pedestal Enclosure

- Pedestal enclosure supports one system, and up to two Universal 43xx StorageWorks shelves.
- Selection of two country-specific power cords (for external connection from power strip to wall outlet) is mandatory for all systems.

200-240V Pedestal Enclosure

BA61P-CB

Step 6c – Rack Kit for M-Series Cabinet or Series 10000 G2 Rack

- Rack Kit required for each AlphaServer ES45 system installed in an M-Series Cabinet or Series 10000 Rack
- Rack Kit supports one system

M-Series	Rack kit for AlphaServer ES45, includes dress bezel, slides, three internal IEC/IEC power cords, all brackets and hardware for mounting in M-Series cabinets, 200-240V	BA61R-CR
Series 10000	Rack kit for AlphaServer ES45, includes slides, three internal IEC/IEC power cords, all brackets and hardware for mounting in Series 10000 racks	3X-BA61R-RD

## Options

### Step 6d – Power Cords – (for Tower/Pedestal Models)

North America, 200 to 240V, 75-inch – Tower	BN18J-1K
North America, 200 to 240V, 108-inch – Pedestal	3X-BN64A-1C
Australia, New Zealand, China, 2.5-meter (8121-0838)	3R-A6023-AA
Central Europe, 2.5-meter	BN19C-2E
Denmark, 2.5-meter (103541-481)	BN19K-2E
Egypt, India, South Africa, 2.5-meter (103541-AR1)	BN19S-2E
Israel, 2.5-meter	3R-A6883-AA
Italy, 2.5-meter (103541-461)	BN19M-2E
Japan, 2.5-meter, Dentori approved	3X-BN46F-02
Switzerland, 2.5-meter (103541-511)	BN19E-2E
UK, Ireland, 2.5-meter	BN19A-2E

### Step 7 - Cabinets

#### Step 7a - M-Series Cabinets - Optional

- M-Series Cabinet enclosures support up to five systems, or one system with up to 10 StorageWorks shelves.
- M-Series Cabinets require mandatory selection of the following items:
  - Rear cabinet extender based on cabinet height
  - Cabinet front door or trim kit based on cabinet height
  - Second power distribution unit (PDU)
  - Factory integration
  - Ballast kit, if only one system is ordered for the H9A15 cabinet

**NOTE:** For more information on M-Series Cabinet Enclosures, see <http://www.compaq.com/alphaserver/products/m-series/specs.html>

Cabinet Configuration Chart for AlphaServer ES45 (8U) with 43xx Series StorageWorks Shelves (3U) – Supports high-density configurations						
Cabinet (b)	Front Door or Trim Kit	Cabinet Depth Extender	Power Distribution Unit	ES45 Systems	43xx/MSA30 Storage Shelves	Unused U Spaces
H9A10-ME/-MF	3X-H9C10-RF or H9C10-ZT	H9C10-ZE	With second H7609	1	8	1
(34U)				2	5	2
				3	3	0
				4	0	1
H9A15-ME/-MF	3X-H9C15-RF or H9C15-ZT	H9C15-ZE	With second H7609	1(a)	10	2
(41U)				2	8	0
				3	3	7
				4	0	8
			(b)	3	3 or 5	1

## Options

			With second H7609	4	0 or 2	2
				5	0	0

### NOTES:

- a. Installation of only one AlphaServer ES45 system in an H9A15 cabinet requires the mandatory selection of a ballast kit.  
b. H9A1x-ME includes one H7609-EB PDU; H9A1x-MF includes one H7609-DB PDU - Order second PDU.

- Single Input - 3X-H7609-DB/EB, 240V
- Dual Input - 3X-H7609-DB/EB, 240V

<b>M-Series Cabinets -</b> Specify cabinet selection	67-inch carbon black cabinet with 59.5-inch or 34U of usable vertical space, 200-240V dual-16A PDU, 16 IEC C13 outlets, two input power plug NEMA L620P, Americas, Asia Pacific; includes rear door.	H9A10-ME
	67-inch carbon black cabinet with 59.5-inch or 34U of usable vertical space, 240V dual-16A PDU, 16 IEC C13 outlets, two input power plug IEC 309, 20A, Europe; includes rear door.	H9A10-MF
	79-inch carbon black cabinet with 71.7-inch or 41U of usable vertical space, 200-240V dual-16A PDU, 16 IEC C13 outlets, two input power plug NEMA L620P, Americas, Asia Pacific; includes rear door.	H9A15-ME
	79-inch carbon black cabinet with 71.7-inch or 41U of usable vertical space, 240V dual-16A PDU, 16 IEC C13 outlets, two input power plug IEC 309, 20A, Europe; includes rear door.	H9A15-MF

<b>Rear Cabinet Extender -</b> Mandatory based on cabinet height	Rear cabinet extender for carbon black H9A10 cabinets	H9C10-ZE
	Rear cabinet extender for carbon black H9A15 cabinets	H9C15-ZE

<b>Front Cabinet Treatment -</b> Mandatory based on cabinet height	Front door for carbon black H9A10 cabinet enclosure	3X-H9C10-RF
	Front trim kit for carbon black H9A10 cabinet enclosure	H9C10-ZT
	Front door for carbon black H9A15 cabinet enclosure	3X-H9C15-RF
	Front trim kit for carbon black H9A15 cabinet enclosure	H9C15-ZT

<b>Factory Integration -</b> Mandatory	Factory Integration of systems and storage devices assembled and configured in cabinet enclosure in predefined locations	YS-ASCAA-AA
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<b>Ballast Kit -</b> Mandatory if only one ES45 system drawer is ordered for the H9A15 cabinet	<ul style="list-style-type: none"> <li>Ballast is added to a cabinet at particular locations for specific configurations to meet safety regulations for installation, operation, and service; see Cabinet Configuration Charts.</li> </ul>	
	Two 35–40 lb (16–18 kg) steel plates	H9C10-MC

<b>Power Distribution Unit -</b> Mandatory	Single Phase, Double Power Controller, 16 outlet North America/Japan 240V	3X-H7609-EB
	Single Phase, Double Power Controller, 16 outlet, Europe 240V	3X-H7609-DB

Options

**Storage Shelves** For supported StorageWorks shelves, see Step 5b.  
**Supported in M-Series Cabinets** - Optional

Step 7b - Rack 10000 G2 Series - Optional

The HP Rack 10000 Series were designed to the 19-inch RETMA standard. The Racks accommodate all HP equipment (ProLiant, Alpha Systems, StorageWorks, UPS, and PDUs) in addition to select third-party equipment. See HP Rack 10000 G2 Series QuickSpecs for details:  
[http://h18000.www1.hp.com/products/quickspecs/12402\\_div/12402\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.HTML)

Configuration Guidelines

- 1. All DS/ES Base Systems require a rack kit to mount systems in a 10000 G2 Series Rack (see below).
- 2. All Base Systems include all required internal IEC/IEC power cords.

<b>10000 G2 Series Rack</b>	10000 G2 Series 42U Rack - mandatory selection of three-phase or two single-phase Power Distribution Units required	AF004A
<b>Rack Kit - Mandatory</b> for 10000 G2 Series Rack	Order one for each ES45 System for mounting in 10000 G2 Series Rack	3X-BA61R-RD
<b>Side Panel Kit - Mandatory</b> Choice of Side Panel Kit or Baying Kit for 10000 G2 Series Rack	Order one per 10000 G2 Series Rack	AF054A
<b>Baying Kit - Mandatory</b> Choice of Side Panel Kit or Baying Kit for 10000 G2 Series Rack	Used to join two or more Series 10000 G2 Racks	248931-B21
<b>Power Distribution Units - Mandatory</b> for 10000 G2 Series Rack		
<b>Single-phase PDU</b>	Single-phase PDU for North America/Japan 200-240V 20A input plug NEMA L620P; 16 outlets	3X-H7609-EB
	Single-phase PDU for International, 240V 20A input plug IEC309, 16 outlets	3X-H7609-DB

Options

Step 7c - KVM (Keyboard, Video, Mouse) Switch - Optional

KVM (Keyboard, Video, Mouse) Switch - Optional	The HP Server Console Switch 1 x 8 (8-port) is supported on Alpha Systems using PS/2 mouse and keyboard with VGA video - this includes support for the PS/2 interface adapter, part number 262588-B21, required for operation. The switch is supported on systems running Tru64 UNIX operating system - minimum version V5.1A and the OpenVMS operating system - minimum version 7.3-2. The KVM is 1U high and can be installed in the M-Series cabinet or Series 10000 rack. Supports up to eight servers. HP Server 1 x 8-port KVM Console Switch	336044-B21
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CAT5e Cables	3 foot (1m) - 4 pack	263474-B21
	6 foot (2m) - 8 pack	263474-B22
	12 foot (4m) - 8 pack	263474-B23
	20 foot (6m) - 4 pack	263474-B24
	40 foot (12m) - 1 pack	263474-B25

Interface Adapters	PS/2 Interface Adapter - 1 pack	262588-B21
	PS/2 Interface Adapter - 8 pack	262587-B21

**NOTE:** Supported graphics cards - ELSA GLoria Synergy (SN-PBXGK-BB), 3Dlabs Oxygen VX1 (SN-PBXGF-AB), and ATI RADEON 7500 (3X-PBXGG-AA)  
For more information, refer to the Release Notes at:  
[http://h18002.www1.hp.com/alphaserver/download/console\\_switch\\_rn.pdf](http://h18002.www1.hp.com/alphaserver/download/console_switch_rn.pdf)  
[http://h18002.www1.hp.com/alphaserver/download/html/console\\_switch\\_rn.html](http://h18002.www1.hp.com/alphaserver/download/html/console_switch_rn.html)

Step 8 - Networking Adapters/Controllers – Mandatory Ethernet Adapter

Step 8a – Networking Adapters/Controllers – Mandatory

- Select mandatory Ethernet adapter
- Adapters require a minimum of Tru64 UNIX V5.1A or OpenVMS V7.3
- Each adapter uses one PCI slot



## Options

		Maximum # Supported				
		Tru64 UNIX	Open VMS	PCI Slot		
Ethernet 10/100	PCI (32/64-bit, 33-MHz to 66-MHz) dual-port 10/100 Ethernet (UTP/RJ45s) NIC and Base Module. (One 3X-DE602-TR or 3X-DE602-FR optional add-on daughter card can be combined with this module.) <b>NOTE:</b> Use BN25G, BN26M, BN24Q, BN28Q twisted pair RJ45 cables.	4	4	3.3/5 V	66 MHz	3X-DE602-BR
Ethernet 10/100/1000	PCI single-port 10/100/1000 Mbps (Twisted-Pair Copper with RJ45) Gigabit Ethernet; Tru64 UNIX V5.1B/TruCluster V5.1B supports up to eight nodes and requires: - T64V51BB22AS0002-20030415.tar Requires Early Release Patch to update driver to V1.0.21: T64V51BB22-C0019200-19212-E-20030710.tar <a href="http://ftp1.support.compaq.com/public/unix/v5.1b/t64v51bb1-0003000-16672-e-20030130.README">http://ftp1.support.compaq.com/public/unix/v5.1b/t64v51bb1-0003000-16672-e-20030130.README</a> Tru64 UNIX V5.1A/TruCluster V5.1A supports up to eight nodes and requires Early Release Patch: - T64V51AB21-C0127901-19213-E-20030710.tar OpenVMS V7.301 support as a standalone network interface and as a cluster interconnect requires that users download and install the following two ECO Kits: DEC-AXPVMS-VMS731_PCSI_V0100-4.PCSI DEC-AXPVMS-VMS731_LAN_V0600-4.PCSI <b>NOTE:</b> Use BN25G, BN26M, BN24Q, BN28Q twisted pair RJ45 cables.	8	8	3.3/5 V	66 MHz	3X-DEGXA-TR

## Step 8b – Networking Adapters/Controllers – Optional

		Maximum # Supported				
		Tru64 UNIX	Open VMS	PCI Slot		
Ethernet 10/100/1000	PCI single-port 1000 Mbps (MMF with duplex-SC) Gigabit Ethernet; Tru64 UNIX V5.1B/TruCluster V5.1B supports up to eight nodes and requires: - T64V51BB22AS0002-20030415.tar Requires Early Release Patch to update driver to V1.0.21: T64V51BB22-C0019200-19212-E-20030710.tar <a href="http://ftp1.support.compaq.com/public/unix/v5.1b/t64v51bb1-0003000-16672-e-20030130.README">http://ftp1.support.compaq.com/public/unix/v5.1b/t64v51bb1-0003000-16672-e-20030130.README</a> Tru64 UNIX V5.1A/TruCluster V5.1A supports up to eight nodes and requires Early Release Patch: - T64V51AB21-C0127901-19213-E-20030710.tar OpenVMS V7.301 support as a standalone network interface and as a cluster interconnect requires that users download and install the following two ECO Kits: DEC-AXPVMS-VMS731_PCSI_V0100-4.PCSI DEC-AXPVMS-VMS731_LAN_V0600-4.PCSI <b>NOTE:</b> Use BN34A, BN34B, or equivalent cables with SC connectors.	8	8	3.3/5 V	66 MHz	3X-DEGXA-SR

## Options

Ethernet 10/100	Dual-port 10/100 Ethernet (UTP/RJ45) add-on daughter card for use with the 3X-DE602-BR only. The combined 3X-DE602-BR and 3X-DE602-TR modules, running at 66MHz, provide four 10/100 (UTP/RJ45s) ports in a single PCI slot option; allows for a maximum of 16 ports per system. OpenVMS V7.3 requires Tima Kit: - DEC-AXPVMS-VMS73_LAN-V0100-4.PCSI <b>NOTE:</b> 3X-DE602-TR cannot be used standalone. Use BN25G, BN26M, BN24Q, or BN28Q twisted pair RJ45 cables.	4	4	3.3/ 5 V	66 MHz	3X-DE602-TR
	Single-port 100 Mbps (MMF/duplex-SC) add-on daughter card for use with the 3X-DE602-BR. The combined 3X-DE602-BR and 3X-DE602-FR modules, running at 66 MHz, provide two 10/100 (UTP/RJ45s) and one 100Mbps (MMF/SC) ports in a single PCI slot option. <b>NOTE:</b> 3X-DE602-FR cannot be used standalone. Use BN34A or BN34B cables.	4	1 per 3X- DE602- BR	3.3/ 5 V	66 MHz	3X-DE602-FR
Multi-function Module	PCI 32-bit, 33-MHz multi-function (single-port 10/100 Ethernet UTP/RJ45, Ultra2 LVD SCSI, and 2D graphics) adapter. Model 1B requires installation on PCI Bus 0 in slots 1 or 2; Models 2B and 3B require installation on PCI Bus 0 in slots 3, 6, 9, or 10 <b>NOTE:</b> Tru64 UNIX V5.1A requires Patch Kit 3: T64V51AS0003-20010413.tar. Only one 3X-KZPEA-DB allowed on same PCI bus; no multi-head graphics support; TruCluster support restricted to non-shared SCSI buses only. Use BN25G, BN26M, BN24Q, or BN28Q twisted pair RJ45 cables.	1	1	5V	33 MHz	3X-DEPVZ-AA
	3X-DEPVZ-AA specific-use 3-meter LVD2 SCSI cable					BN37A-03
Synchronous Communications	PCI (32-bit, 33-MHz) to Dual-port Intelligent Synchronous Communications NIC – Requires at least one (maximum two) 3X-BC34x sync cable listed below.	4	4	3.3/ 5 V	33 MHz	3X-PBXDD-AA
	PCI (32-bit, 33-MHz) to Quad-port Intelligent Synchronous Communications NIC – Requires at least one (maximum four) 3X-BC34x sync cable listed below.	4	4	3.3/ 5 V	33 MHz	3X-PBXDD-AB
Synchronous-specific Cables	V.24/EIA-232 Single-port cable					3X-BC34L-06
	V.11/x.21 Single-port cable					3X-BC34S-06
	V.35 Single-port cable					3X-BC34T-06

## Options

Asynchronous Communications	PCI (32-bit, 33-MHz) to 4-port Async Communications NIC with DB-25 octopus cable <b>NOTE:</b> The Tru64 UNIX driver (UNIX Tar File 4001180K.tar) is located at: <a href="http://support.digi.com/support/indexes/tru64-xr.html">http://support.digi.com/support/indexes/tru64-xr.html</a> The OpenVMS driver kit (Filename 4001778L.bin) is located at <a href="http://support.digi.com/support/drivers/vms/index-async.html">http://support.digi.com/support/drivers/vms/index-async.html</a>	2	2	3.3/5 V	33 MHz	PBXDA-BA
	PCI (32-bit, 33-MHz) to 8-port Async Communications NIC with DB-25 octopus cables <b>NOTE:</b> The Tru64 UNIX driver (UNIX Tar File 4001180K.tar) is located at: <a href="http://support.digi.com/support/indexes/tru64-xr.html">http://support.digi.com/support/indexes/tru64-xr.html</a> The OpenVMS driver kit (Filename 4001778L.bin) is located at <a href="http://support.digi.com/support/drivers/vms/index-async.html">http://support.digi.com/support/drivers/vms/index-async.html</a>	2	2	3.3/5 V	33 MHz	PBXDA-BB
	PCI (32-bit, 33-MHz) to 16-port Async Communications Controller and tabletop 16-port distribution box with RJ45 connectors.	2	2	3.3/5 V	33 MHz	PBXDA-AC

## Step 8c – Multi-use Cables

Ethernet, FDDI, ATM	Multimode fiber optic (MMF) 62.5/125um duplex cable, with SC-to-ST connectors xx = available lengths: (2E, 4E, 01, 03, 10, 20, 30) for 2.4, 4.5, 1, 3, 10, 20, and 30 meters					BN34A-xx
	Multimode fiber optic (MMF) 62.5/125um duplex cable, with SC-to-SC connectors xx = available lengths: (2E, 4E, 01, 03, 10, 20, 30) for 2.4, 4.5, 1, 3, 10, 20, and 30 meters					BN34B-xx
	Category 5e (4-Unshielded Twisted Pairs / UTP) straight-through cable with RJ45-to-RJ45 connectors for system to switch, repeater, or hub connectivity xx = available lengths: (0B, 0E, 01, 03, 04, 07) for 0.2, 0.5, 1, 3, 4, and 7 meters					BN25G-xx
	Category 5e (4-Twisted Pairs, Screened/ ScTP) straight-through cable with RJ45-to-RJ45 connectors for system to switch, repeater, or hub connectivity xx = available lengths: (0E, 01, 03, 04, 07) for 0.5, 1, 3, 4, and 7 meters					BN26M-xx
	Category 5e (4-Unshielded Twisted Pairs / UTP) Xover cable with RJ45-to-RJ45 connectors for system to switch, repeater, or hub connectivity xx = available lengths: (0E, 01, 03, 04, 07) for 0.5, 1, 3, 4, and 7 meters					BN24Q-xx
	Category 5e (4-Twisted Pairs, Screened / ScTP) Xover cable with RJ45-to-RJ45 connectors for system to switch, repeater, or hub connectivity xx = available lengths: (0E, 01, 03, 04, 07) for 0.5, 1, 3, 4, and 7 meters					BN28Q-xx

## Options

### Step 9 - Memory Channel - Optional

#### Tru64 UNIX Systems (V5.1A)

Each system node in the cluster requires a TruCluster software license (QL-6BRAE-AA) or TruCluster Plus Software Package (QP-6R9AE-AA)

#### OpenVMS Systems

OpenVMS V7.3 and OpenVMS Cluster license (QL-MUZAE-AA) are required

#### Configuring Information

- Memory Channel adapters (CCMAB-BA) must be configured in 5-volt PCI slots.
- Up to two PCI-to-System Area Network adapters (CCMAB-BA) are supported in a single system.
- Two-node clusters can be configured by ordering a CCMAB-BA for each node and one BN39B-04 or BN39B-10 cable; cable connects directly to CCMAB-BA in each node.
- Two-node clusters can also be configured by ordering two CCMAB-BA adapters for each node and two BN39B-04 or BN39B-10 cables; cables connect directly to CCMAB-BA in each node.
- For a two-node cluster that will not need to be rebooted when adding additional members, order one CCMAB-BA adapter and one BN39B-04 or BN39B-10 cable for each node, and one CCMHB-AA hub for the cluster.
- For three- or four- node clusters, order one CCMAB-BA adapter and one BN39B-04 or BN39B-10 cable for each node, and one CCMHB-AA hub for the cluster. If two CCMAB-BAs are configured in each system, a second CCMHB-AA is required.
- CCMHB-AA includes four CCMLB-AA line cards and supports up to four nodes; expansion up to eight system nodes can be achieved by adding up to four CCMLB-AA line cards.
- If nodes must be separated by a distance longer than standard copper cables allow the CCMFB option converts the output of the standard CCMAB controller or CCMLB line card to single-mode fiber optic cable. The fiber optic connection may be up to 2,000 meters long between two CCMAB controllers connected in virtual hub mode, or 3,000 meters between a CCMAB controller and a CCMHB hub. (The connection from the CCMHB hub to a second system may also be 3,000 meters.) The CCMFB option requires a second PCI slot in the system from which it draws power only. It is normally connected to the corresponding CCMAB controller with the short BN39B-01 cable. The CCMFB is also used in the CCMHB hub where it occupies a slot normally used by the CCMLB line card, limiting expansion to four radial fiber optic connections.
- CCMHB-BA hub expansion box provides additional slots for up to eight fiber optic connections. Two standard length single-mode fiber optic cables are available (BN34R-10 and BN34R-31); however, users normally provide this fiber optic connection. Fiber optic connectivity is completely transparent to the systems using it and has no performance impact.

**NOTE:** When configuring Model 1B or Model 2B with two Memory Channel Controllers (CCMAB-BA) installed in hose 0 only, all nodes in a Memory Channel cluster must have the window size jumper set to the same size, specifically 128. When configuring Model 3B with two Memory Channel Controllers (CCMAB-BA), all nodes in a Memory Channel cluster must have the window size jumper set to the same size, specifically 128; Memory Channel Hub must be installed on a different hose (hose 0, 1, or 2). Refer to the TruCluster QuickSpecs for Memory Channel details.

## Options

Model 1B	Model 2B	Model 3B
128K I/O	128K I/O	128K I/O
Use for new or existing clusters; if existing cluster at 512K, shut down and configure all nodes to 128K	Use for new or existing clusters; if existing cluster at 512K, shut down and configure all nodes to 128K	Use for new or existing clusters; if existing cluster at 512K, shut down and configure all nodes to 128K
Supports dual-rail, (two) Memory Channel controllers on single PCI Bus 0	Supports dual-rail, (two) Memory Channel controllers on single PCI Bus 0	Supports dual-rail, (two) Memory Channel controllers on separate PCI Bus (0, 1, or 2)

### MEMORY CHANNEL Controller/System Area Network Hub

PCI-to-System Area Network Controller, maximum two - 5V/3.3V	CCMAB-BA
System Area Network Hub with four line cards; includes BN19P-2E power cord for Canada, Japan, and U.S. - for other regions, order appropriate power cord from the following list:	CCMHB-AA
Hub expansion box with no line cards	CCMHB-BA
Expansion line card for CCMHB hub	CCMLB-AA
1-meter cable for CCMAB and CCMHB	BN39B-01
4-meter cable for CCMAB and CCMHB	BN39B-04
10-meter cable for CCMAB and CCMHB	BN39B-10
Copper-to-single mode fiber optic converter – 5V (clock not affected)	CCMFB-BA
Rackmount kit (3U) for CCMHB (Memory Channel Hub II); required for mounting in H9A1x cabinets.	3X-BA61R-MC
Power cord for rackmount CCMHB hub	BN35S-02

### MEMORY CHANNEL Power Cords

Australia, New Zealand, China (8121-0838)	3R-A6023-AA
Central Europe	BN19C-2E
Denmark (103541-481)	BN19K-2E
Egypt, India (103541-AR1)	BN19S-2E
Ireland, United Kingdom	BN19A-2E
Israel	3R-A6883-AA
Italy (103541-461)	BN19M-2E
Japan, 2.5-meter, Dentori approved	3X-BN46F-02
Switzerland (103541-511)	BN19E-2E

**NOTE:** When using MEMORY CHANNEL, refer to the TruCluster QuickSpecs for configuration guidelines and restrictions:

<http://www.compaq.com/products/quickspecs/Division/10657.html>

The MEMORY CHANNEL controller, CCMAB-AA, must be revision D01 or later.

**NOTE:** This Web Site is available in English only.

## Step 10 - Storage Adapters/Controllers - Mandatory

**NOTE:** Refer to the following chart when configuring adapters, shelves, and disks.

## Options

AlphaServer ES45 Configuration Chart for Storage Adapters					
Storage Adapters		Shelf	Disk Drives	Tru64 UNIX	OpenVMS
3X-KZPCA-AA		BA610-6D	3R-A0xxx-AA 1-inch Universal	V5.1A	V7.3
3.3/5 V	33 MHz	DS-SL13R-xx	3R-A1xxx-AA 1-inch Universal		
		3R-A4075-AA/3R-A4076-AA	3R-A3xxx-AA 1-inch Universal		
3X-KZPEA-DB		BA610-6D	3R-A0xxx-AA 1-inch Universal	V5.1A	V7.3
3.3/5 V	33 MHz	DS-SL13R-Bx	3R-A1xxx-AA 1-inch Universal		
		3R-A4075-AA/3R-A4076-AA	3R-A3xxx-AA 1-inch Universal		
* Requires 3X-DWZCV-BA/CA, HVD-to-LVD converter					

RAID Controller				
3X-KZPDC-BE/DF	BA610-6D	3R-A0xxx-AA 1-inch Universal	V5.1B/V5.1A	V7.3-1
	DS-SL13R-xx	3R-A1xxx-AA 1-inch Universal		
	3R-A4075-AA/3R-A4076-AA	3R-A3xxx-AA 1-inch Universal		

		Maximum # Supported				
		Tru64 UNIX	Open VMS	PCI Slot		
SCSI	PCI 2-port Ultra3 (LVD2) SCSI adapter, 64-bit/66-MHz dual-channel (uses one PCI slot); includes internal 68-pin and external 68-pin VHDCI connectors; requires 3X-BC56J-xx cable to connect adapter to DS-SL13R-Bx shelf; supports internal SDLT tape drives and external SDLT tape libraries. HSZxx RAID controllers not supported. Supports dual-bus (Models 4354R and 4454R) and single-bus (Models 4314R and 4414R) shelves with 3X-KZPEA-DB adapter. Tru64 UNIX requires graphics adapter to run console utilities (RUN BIOS). MSA30 enclosures (Models 4414R and 4454R) are not supported in shared SCSI configurations. 3X-KZPEA-DB adapter supports shared SCSI under Tru64 UNIX V5.1B and TruCluster V5.1B with Initial Patch Kit installed; supports maximum of two nodes per shared bus; requires 3X-BN55A-01 Y-cable and connector plug assembly, and 3X-H32CT-AA external LVD terminator per shared bus. <b>NOTE:</b> Tru64 UNIX Initial Patch Kit for V5.1B is located at: <a href="http://ftp1.support.compaq.com/public/unix/v5.1b">http://ftp1.support.compaq.com/public/unix/v5.1b</a>	6	6	3.3/5 V	66 MHz	3X-KZPEA-DB
	Ultra160 cable, VHDCI to VHDCI (341174-B21 - 6-feet, 341175-B21 - 12-feet, 164604-B21 - 24-feet) xx = 02 (6-feet), 03 (12-feet), 04 (24-feet)					3X-BC56J-xx
	PCI 1-port Ultra2 (LVD) SCSI adapter, 32-bit/33-MHz, single-channel (uses one PCI slot); includes internal 68-pin and external 68-pin HD connectors; order BN38C-xx cable to connect adapter to Ultra3 shelf, or order VHDCI converter (BN38E-0B) for use with included cable; HSZxx RAID controllers not supported. No support for shared SCSI.	6	6	3.3/5 V	33 MHz	3X-KZPCA-AA
	68-pin HD male-to-VHDCI male UltraSCSI cable; xx = 02, 03, 05, 10, 20 meters					BN38C-xx

## Options

Fibre Channel	<p>PCI-X 64-bit 144-MHz 2-GB StorageWorks Fibre Channel Host Bus Adapter - FCA2684 - single channel</p> <p><b>NOTE:</b> For configuration details refer to the Supported Options List at <a href="http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html">http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html</a></p> <p>The following pointer also provides additional information regarding this FCA: <a href="http://h18006.www1.hp.com/products/storageworks/fca2684/index.html">http://h18006.www1.hp.com/products/storageworks/fca2684/index.html</a></p>	6	6	3.3/5 V	66 MHz	DS-A5132-AA
	<p>PCI-X 64-bit 144-MHz 2-GB StorageWorks Fibre Channel Host Bus Adapter - FCA2684 - dual channel</p> <p><b>NOTE:</b> For configuration details refer to the Supported Options List at <a href="http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html">http://h18002.www1.hp.com/alphaserver/options/ases45/ases45_options.html</a></p> <p>The following pointer also provides additional information regarding this FCA: <a href="http://h18006.www1.hp.com/products/storageworks/fca2684/index.html">http://h18006.www1.hp.com/products/storageworks/fca2684/index.html</a></p>	4	4	3.3/5 V	66 MHz	DS-A5134-AA
	See Fibre Channel cables and switches, Step 11					
Multi-function Module	<p>PCI 32-bit, 33-MHz multi-function (single-port 10/100 Ethernet UTP/RJ45, Ultra2 LVD SCSI, and 2D graphics) adapter. Model 1B requires installation on PCI Bus 0 in slots 1 or 2; Models 2B and 3B require installation on PCI Bus 0 in slots 3, 6, 9, or 10</p> <p><b>NOTE:</b> Tru64 UNIX V5.1A requires Patch Kit 3: T64V51AS0003-20010413.tar. Only one 3X-KZPEA-DB allowed on same PCI bus; no multi-head graphics support</p> <p>Use BN25G, BN26M, BN24Q, or BN28Q twisted pair RJ45 cables.</p>	1	1	5 V	33 MHz	3X-DEPVZ-AA
	3X-DEPVZ-AA specific-use 3-meter LVD2 SCSI cable					BN37A-03
RAID	<p>PCI 2-port PCI to Ultra3, 64-bit, 66 MHz, LVD backplane RAID controller with 128-MB cache (uses one PCI slot); requires connection to DS-SL13R-xx shelves or BA610-6D card cage.</p> <p><b>NOTE:</b> Tru64 UNIX requires V5.1B and TruCluster V5.1B (non- shared buses only) with Initial Patch Kit: T64V51BV1AS0001-20021229.tar</p> <p>Tru64 UNIX requires V5.1A with Initial Patch Kit: T64V51AV21AS0004-20030206.tar</p> <p><b>NOTE:</b> No host-based volume shadowing or shared bus support under OpenVMS.</p>	6 per system, 3 per PCI bus	6 per system, 3 per PCI bus	3.3/5 V	66 MHz	3X-KZPDC-BE

## Options

	PCI 4-port PCI to Ultra3, 64-bit, 66 MHz, LVD backplane RAID controller with 256-MB cache (uses one PCI slot); requires connection to DS-SL13R-xx shelves or BA610-6D card cage. <b>NOTE:</b> Tru64 UNIX requires V5.1B and TruCluster V5.1B (non-shared buses only) with Initial Patch Kit: T64V51BV1AS0001-20021229.tar Tru64 UNIX requires V5.1A with Initial Patch Kit: T64V51AV21AS0004-20030206.tar	6 per system,	6 per system,	3.3/5 V	66 MHz	3X-KZPDC-DF
		3 per PCI bus	3 per PCI bus			
	U320 LVD SCSI Backplane Raid Controller, 64 bit, 2 Channel		6 per system, 3 per PCI bus	3.3/5 V	66 MHz	3X-KZPEC-BF
	U320 LVD SCSI Backplane Raid Controller, 64 bit, 4 Channel		6 per system, 3 per PCI bus	3.3/5 V	66 MHz	3X-KZPEC-DG

<b>HVD to LVD Converters</b>	<p>HVD (High Voltage Differential) adapters and LVD (Low Voltage Differential) devices are normally incompatible due to their different signaling voltage levels. This incompatibility does not allow direct communication between the different technologies. The HVD to LVD converter allows connectivity between legacy HVD Host Bus Adapters and today's LVD devices. The converter provides:</p> <ul style="list-style-type: none"> <li>Connectivity in direct attach or shared configurations of all currently available LVD devices, including disks, tapes, libraries, and shelves (4314 or 4354) when used with the KZPBA-CB and 3X-KZPBA-CC HVD adapters. With the retirement of StorageWorks 1 disks and HVD shelves (BA36R), converters are desirable where upgrades to LVD HBAs, or upgrades to current operating system versions are not possible.</li> <li>Shared and direct attach configurations are interconnected much the same as those previously configured with homogeneous HVD solutions, except that the HVD output is now passed through the converter before proceeding to the LVD device. Where required, Y cables (BN21W-0B), terminators (H879-AA), cables (BN38C-10, BN37A-20), one or two HVD/LVD converters (one-port, two-port), Memory Channel adapters (CCMAB), one Memory Channel cable (BN39B-10), are used in conjunction with the LVD device of choice.</li> </ul>					
	HVD to LVD one-port converter					3X-DWZCV-BA
	HVD to LVD two-port converter					3X-DWZCV-CA

## Step 11 - Storage Devices - Optional



## Options

### Step 11a - Tape Devices

For detailed tape drive information see

<http://www.compaq.com/products/storageworks/sitemap.html#tapedrives>

- System includes embedded 1.44-MB diskette drive
- System includes embedded 5.25-inch half-height 600-MB 16X ATPI DVD-ROM drive
- Removable media slots provide support for up to two 5.25-inch half-height devices, or one 5.25-inch full-height (remove slot separator) removable media device; select up to two DAT devices or one DLT/SDLT tape device
- For maximum performance, tape libraries must be configured with Fast Wide Differential (FWD) controllers for tape backup

#### DAT Tape Drives (Internal)

- Select up to two DAT devices
- The following DAT tape drives are supported with 3X-KZPCA-AA adapter; TLZ10 tape drives are supported with 3X-KZPEA-DB adapters on Tru64 UNIX and OpenVMS systems (4 per bus).

DAT 40-GB LVD internal tape drive (C5686C)	3R-A6831-AA
DAT 72-GB LVD internal tape drive (Q1522B)	3R-A6663-AA
1-meter Ultra2 68-pin LVD cable with two connectors, multimode terminator and two wide-to-narrow adapters	3X-BN46M-01

#### DAT Tabletop Tape Drives

DAT 40-GB LVD tabletop tape drive with North America power cord	C5687D
DAT 72-GB LVD tabletop SCSI tape drive with 120V North America power cord, carbon black	Q1523B

#### DAT Hot-plug Tape Drive

DAT 40-GB hot-plug LVD tape drive (Q1546A), uses two slots in BA610-6D or 43xxx shelves (cannot be sold in Europe)	3R-A4745-AA
DAT 72-GB hot-plug LVD tape drive (Q1529A), uses two slots in BA610-6D or 43xxx shelves (cannot be sold in Europe)	3R-A4547-AA

#### DAT Autoloaders

DAT 20/40-GB auto loader external	AE313A
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#### DLT/SDLT Tape Drives (Internal)

- Select one DLT/SDLT tape device
- The following DLT/SDLT tape drives are supported with 3X-KZPCA-AA or 3X-KZPEA-DB LVD adapters

VS160 HH DLT 80/160-GB tape drive	A7569B
SDLT 600-GB 32MB/s tape drive	A7518B

#### DLT/SDLT Tabletop Tape Drives

SDLT 600--GB external tape driveNA	A7519B
SDLT 600GB external tape drive, WW	A7520B
VS160 HH DLT 80/160GB tape drive, external NA	A7570B
VS160 HH DLT 10/160GB tape drive, external WW	A7571B

## Options

3U Rackmount Tape Drive Enclosure	3U LVD Rackmount Tape Drive Enclosure for use in M-Series Cabinets and Series 10000 Cabinets, 0 drives, carbon black	274338-B22
	Rackmount Kit for H9Axx M-Series Cabinets, carbon black – required for mounting 3U Rackmount Tape Drive Enclosure in M-Series cabinet	3R-A3804-AA

**NOTE:** The 3U Rackmount Tape Enclosure supports up to four internal half-height removable devices, or up to two full-height devices; select up to four DAT devices or two DLT/SDLT devices with 3U Rackmount Tape Enclosure (274338-B22) or select one of the preconfigured configurations listed below.

## Step 11b –Modular Data Routers

### Network Storage Routers **NOTE:**

- e2400 and e1200 support LVD tape drives and tape libraries
- e2400 supports ESL family tape drives and tape libraries
- e1200 supports MSL family tape drives and tape libraries

e1200-320 One Fibre Channel x 2 LVD FC to SCSI Data Router, Tru64 UNIX and OpenVMS	AD577A
e2400160 One Fibre Channel x 4 LVD FC to SCSI Data Router with card cage, Tru64 UNIX and OpenVMS	AA960A
NSR e2400 One Fibre Channel x 4 LVD FC to SCSI Data Router with no card cage, Tru64 UNIX and OpenVMS	AA928A
e1200-320 One Fibre Channel x 2 LVD FC to SCSI Data Router, Tru64 UNIX and OpenVMS	AD576A

## Step 11c – External Storage Solutions/Controllers

### Enterprise Virtual Array 5000

ES45 servers support HP Enterprise Virtual Array 5000 (EVA5000) StorageWorks products running Tru64 UNIX and OpenVMS.

The EVA5000 is available in pre-defined configurations with controllers and/or expansion configurations without controllers. The EVA5000 also offers a pre-defined configuration that is optimized for High Performance Technical Computing (HPTC) environments. For ordering information and configuration rules, refer to the EVA5000 QuickSpecs at:

[http://h18000.www1.hp.com/products/quickspecs/11006\\_div/11006\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/11006_div/11006_div.HTML)

### Enterprise Virtual Array 3000

ES45 servers support HP Enterprise Virtual Array 3000 (EVA3000) StorageWorks products running Tru64 UNIX and OpenVMS. Available in one of four integrated "independent bundle" configurations, the EVA3000 includes one pair of HSV100 controllers, two Fibre Channel drive enclosures and 8 to 16 Fibre Channel disk drives (bundle dependent). The EVA3000 is a full 2-Gb end-to-end Fibre Channel Array solution, which operates in 1-Gb, 2-Gb, or mixed 1-Gb/2-Gb SAN fabrics. For ordering information and configuration rules, refer to the EVA3000 QuickSpecs at:

[http://h18000.www1.hp.com/products/quickspecs/11619\\_div/11619\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/11619_div/11619_div.HTML)

## Options

<b>Modular SAN Array 1000 (msa 1000)</b>	<p>Modular SAN Array 1000, supported on Tru64 UNIX and two-node clusters (maximum); supported with DS-A5132-AA and DS-A5134-AA adapters; requires connection via a switch - no direct connect; no support for FC arbitrated loop</p> <p>Tru64 UNIX V5.1A requires Patch Kit 4: T64V51AB21AS0004-20030206.tar</p> <p>Tru64 UNIX V5.1B requires Patch Kit 1: T64V51BB03AS0001-20021229.tar</p> <p>OpenVMS V7.3-1 requires TIMA Kit: VMS731_MSA1000-V0100</p> <p>OpenVMS V7.3 requires TIMA Kit: VMS73_FIBRE_SCSI-V0500</p> <p>OpenVMS V7.2-2 requires TIMA Kit: VMS722_FIBRE_SCSI-V0400</p> <p>HP recommends OpenVMS customers run the default msa1000 cache settings at 50% read cache and 50% write cache; if a change to the default cache is required, msa1000 cache must be set to 50% write cache or higher (lower than 50% write cache is not supported)</p> <p><b>NOTE:</b> Requires M-Series Rack Kit.</p> <p>M-series Rack Kit</p>	<p>201723-B22</p> <p>313877-B21 3R-A5281-AA</p>
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StorageWorks Disk Array Family	NOTE: The HP StorageWorks Disk Array Family, specifically the XP128 and XP1024, are supported on AlphaServer ES45 systems. For product and ordering information, refer to the following Web pages: <a href="http://www.hp.com/products1/storage/products/disk_arrays/highend/xp1024/index.html">http://www.hp.com/products1/storage/products/disk_arrays/highend/xp1024/index.html</a> <a href="http://www.hp.com/products1/storage/products/disk_arrays/highend/xp128/index.html">http://www.hp.com/products1/storage/products/disk_arrays/highend/xp128/index.html</a> The following part numbers have been assigned for reference purposes only:		
	3R-A4417-AA	A7876A	XP128 Disk Array Control Frame
	3R-A4418-AA	A7906A	XP1024 Disk Array Control Frame
		AE001A	XP12000 Disk Array Control
			Frame

## Step 12 - Graphics Adapters - Optional

- Select graphics adapter, monitor, and country-specific keyboard for Tru64 UNIX and OpenVMS systems if required.

		Maximum # Supported				
		Tru64 UNIX	Open VMS	PCI/ AGP Slot		
2D/3D Graphics	<p>RADEON 7500 PCI 3D graphics accelerator; Tru64 UNIX: Requires V5.1B with latest patch kit. Dual head on first card only (unique video DVI port for 2D or 3D.</p> <p>OpenVMS: Requires V7.3-1 with TIMA Kit: DEC-AXPVMS-VMS731_GRAPHICS-V0300-4.PCSI or latest version. Dual head on first card only (cloned video using DVI port for 2D or 3D.</p> <p><b>NOTE:</b> For multi-head support, refer to Read Me First document/Release Notes. Do not mix with other graphics cards.</p>	4 - (2D only) 1 - 3D	4 - 2D/3D	3.3/ 5 V	66 MHz	3X-PBXGG-AA

## Options

	RADEON 7500 AGP 2D/3D graphics accelerator; Tru64 UNIX V5.1B with latest patch kit: Tru64 UNIX supports a maximum of 4 graphics heads when configured with additional RADEON PCI cards (3X-PBXGG-AA) OpenVMS requires: DEC-AXPVMS-VMS731_GRAPHICS-V0200-4.PCSI or latest version <b>NOTE:</b> Can only operate in Model 1B in slot 3; supports 2X mode only; do not mix with other graphic card types.	1	1	1.5 V	4X	3X-PBXGG-AB
2D	PCI 32-bit, 33-MHz multi-function (single-port 10/100 Ethernet UTP/RJ45, Ultra2 LVD SCSI, and 2D graphics) adapter. Model 1B requires installation on PCI Bus 0 in slots 1 or 2; Models 2B and 3B require installation on PCI Bus 0 in slots 3, 6, 9, or 10. <b>NOTE:</b> Tru64 UNIX V5.1A requires Patch Kit 3: T64V51AS0003-20010413.tar Only one 3X-KZPEA-DB allowed on same PCI bus; no multi-head graphics support; TruCluster support restricted to non-shared SCSI buses only. Use BN25G, BN26M, BN24Q, or BN28Q twisted pair RJ45 cables.	1	1	5 V	33 MHz	3X-DEPVZ-AA

## Step 13 - Monitors

- Graphics monitors other than those listed can be used if compatible with SVGA graphics ordered with system
- A video cable, 6-foot/1.8-meter length, is included with all variants of monitors
- Video extension cable required if monitor is located more than 1 meter from server
- Monitors will ship with, but not be integrated with systems.

### CRT Monitors

V7600 17-inch (16-inch viewable image size) 0.24mm FST multi-frequency color monitor, 2-tone (carbon/silver), VGA to 1024 x 768 @85 Hz, MPRII/TCO 99/Energy Star Compliant, Northern Hemisphere with NA power cord, VGA cable	3R-A5853-AA
Same as above, with Euro power cord	3R-A5854-AA
Same as above, Taiwan, NA power cord	PF996AA#AB0
Same as above, with PRC power cord, CCIB	3R-A5857-AA
Same as above, Southern Hemisphere with Australia/New Zealand power cord	PF996AA#ABG

## Options

Flat Panel Monitors	L2065 20" (20.1" viewable image area) flat panel monitor 0.255mm pixel pitch, 1600 x 1200 @60 Hz, A + D, TCO 03, Energy Star compliant, 4 video input connectors, (VGA, DVI-I, composite video and s-video), NA power cord, VGA and DVI-I cables	3R-A6701-AA
	L2035 20" (20.1" viewable image area) flat panel monitor 0.255mm pixel pitch, 1600 x 1200 @60 Hz, A + D, TCO 03, Energy Star compliant, 4 video input connectors, (VGA, DVI-I, composite video and s-video), Euro power cord, VGA and DVI-I cables	3R-A6702-AA
	L1955, 19" (19" viewable image size) TFT flat panel monitor, 0.294mm pixel pitch, 1280 x 1024 @60Hz, multi-mode support, MPRII/TCO 03/Energy Star compliant, one VGA, one DVI-I input connector. NA power cord, VGA and DVI-D cables	PD974AA#ABA
	L1955, 19" (19" viewable image size) TFT flat panel monitor, 0.294mm pixel pitch, 1280 x 1024 @60Hz, multi-mode support, MPRII/TCO 03/Energy Star compliant, one VGA, one DVI-I input connector. Euro power cord, VGA and DVI-D cables	PH466A#ABB
	L1506, 15." (15" viewable image size) TFT flat panel monitor, 0.297 mm pixel pitch, 1024 x 768 @60 Hz, multi-mode support, MPRII/TCO99/Energy Star compliant, NA power cord, VGA cable	3R-A6515-AA
	L1530, 15." (15" viewable image size) TFT flat panel monitor, 0.297 mm pixel pitch, 1024 x 768 @60 Hz, multi-mode support, MPRII/TCO99/Energy Star compliant, Euro power cord, VGA cable	3R-A6516-AA
Flat Panel Monitor – Rack Mountable	TFT7210R 17" (17" viewable image area) 1U rack-mount flat panel display, 0.264mm pixel pitch, 1280 x 1024 @60/75 Hz, high and low voltage power cords, worldwide	3R-A5187-AA
Video Extension Cable	6-foot/1.8-meter video extension cable optional	BN39C-02
Monitor Power Cords	North American, 120 V, 75-inch	BN26J-1K
	Australia, New Zealand, China, 2.5-meter	3R-A6023-AA
	Central Europe, 2.5-meter	BN19C-2E
	Denmark, 2.5-meter	BN19K-2E
	Egypt, India, South Africa, 2.5-meter	BN19S-2E
	Israel, 2.5-meter	3R-A6883-AA
	Italy, 2.5-meter	BN19M-2E
	Japan, 2.5-meter, Dentori approved	3X-BN46F-02
	Switzerland, 2.5-meter	BN19E-2E
	UK, Ireland, 2.5-meter	BN19A-2E

## Step 14 - Keyboards, Mouse, Documentation

## Options

### Keyboards - Optional

- Select a keyboard and mouse
- All keyboards listed may not be available in all geographies
- Select an opal OpenVMS keyboard for use with VT5xx text terminals.

	Opal	Carbon	
Keyboard/Language	OpenVMS	Tru64 UNIX	OpenVMS*
U.S. keyboard	3X-LK465-A2	3R-A6586-AA	3X-LK464-A2
Arabic keyboard	-	3R-A6572-AA	-
Belgian keyboard	3X-LK465-AB	3R-A6573-AA	3X-LK464-AB
BHCSY keyboard	-	3R-A6574-AA	-
Canadian/English keyboard	3X-LK465-AQ	-	3X-LK464-AQ
Canadian/French keyboard	3X-LK465-AC	3R-A6575-AA	3X-LK464-AC
Cyrillic keyboard (Russian)	3X-LK465-BT	3R-A6576-AA	3X-LK464-BT
Czech keyboard	3X-LK465-BV	3R-A6577-AA	3X-LK464-BV
Danish keyboard	3X-LK465-AD	3R-A6578-AA	3X-LK464-AD
Dutch keyboard	3X-LK465-AH	3R-A6579-AA	3X-LK464-AH
Finnish keyboard	3X-LK465-AF	3R-A6580-AA	3X-LK464-AF
French keyboard	3X-LK465-AP	3R-A6581-AA	3X-LK464-AP
German keyboard	3X-LK465-AG	3R-A6582-AA	3X-LK464-AG
Greek keyboard	3X-LK465-BH	3R-A6583-AA	3X-LK464-BH
Hebrew keyboard	3X-LK465-AT	3R-A6584-AA	3X-LK464-AT
Hungarian keyboard	3X-LK465-BQ	3R-A6585-AA	3X-LK464-BQ
International keyboard	-	3R-A6586-AA	-
Italian keyboard	3X-LK465-AI	3R-A6587-AA	3X-LK464-AI
Japanese keyboard	-	3R-A6588-AA	-
Korean keyboard	-	3R-A6589-AA	-

Latin-American keyboard	-	3R-A6590-AA	-
Norwegian keyboard	3X-LK465-AN	3R-A6591-AA	3X-LK464-AN
Polish keyboard	3X-LK465-BP	3R-A6592-AA	3X-LK464-BP
Portuguese keyboard	3X-LK465-AV	3R-A6593-AA	3X-LK464-AV
Romanian keyboard	3X-LK465-BL	-	3X-LK464-BL
Simplified Chinese keyboard	-	3R-A6594-AA	-
Slovak keyboard	3X-LK465-CZ	3R-A6595-AA	3X-LK464-CZ
Spanish keyboard	3X-LK465-AS	3R-A6596-AA	3X-LK464-AS
Swedish keyboard	3X-LK465-AM	3R-A6597-AA	3X-LK464-AM
Swiss/French keyboard	3X-LK465-AK	3R-A6598-AA	3X-LK464-AK
Swiss/German keyboard	3X-LK465-AL	-	3X-LK464-AL
Traditional Chinese keyboard	-	3R-A6599-AA	-
Thai keyboard	-	3R-A6600-AA	-
Turkish Q keyboard	3X-LK465-BU	3R-A6601-AA	3X-LK464-BU
Turkish/F keyboard	3X-LK465-BW	-	3X-LK464-BW

## Options

UK keyboard	-	3R-A6602-AA	3X-LK464-A2
Yugoslavian keyboard	3X-LK465-BY	-	3X-LK464-BY

\*OpenVMS keyboard (3X-LK464-xx) comes with PS/2 and USB connectors

<b>Keyboard or Mouse Extension Cable</b>	6-foot/1.8-meter keyboard or mouse extension cable; to extend both keyboard and mouse order two cables	3X-BC34A-06
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<b>Mouse</b>	3-button mouse – carbon	3X-PBQWS-PS
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<b>Documentation</b>	Additional AlphaServer ES45 System Information Kit (print and CD), Owners Guide, User Interface Guide, and Release Notes	QA-6E88A-G8
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## Step 15 - Software - Media and documentation required for first system on site

- Software Processor Code = E

<b>Tru64 UNIX</b>	<ul style="list-style-type: none"> <li>• AlphaServer ES45 Tru64 UNIX systems include Unlimited User license, Server Extension license, Internet Express, and Secure Web Server</li> </ul>
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<b>When using Tru64 UNIX V5.1A</b>	Tru64 UNIX media and online documentation on CD-ROM	QA-6ADAA-H8
	Tru64 UNIX full hard copy documentation	QA-6ADAA-GZ
	TruCluster Plus Software Package, licenses for TruCluster Server, Logical Storage Manager and AdvFS Utilities	QP-6R9AE-AA
	TruCluster Server License	QL-6BRAE-AA
	Logical Storage Manager License	QL-2GVAE-AA
	AdvFS Utilities License	QL-0EGAE-AA
	Advanced Server for Tru64 UNIX, 25 client concurrent use license	QL-5U29M-3D
	Advanced Server for Tru64 UNIX, 50 client concurrent use license	QL-5U29M-3E
	Advanced Server for Tru64 UNIX, 100 client concurrent use license	QL-5U29M-3F
	Advanced Server for Tru64 UNIX, 250 client concurrent use license	QL-5U29M-3G
	Advanced Server for Tru64 UNIX, 500 client concurrent use license	QL-5U29M-3H
	Layered products media and documentation for Tru64 UNIX on CD-ROM	QA-054AA-H8
	DECnet/OSI extended function license for Tru64 UNIX	QL-MTKAE-AA
	DECnet/OSI end-system license for Tru64 UNIX	QL-MTJAE-AA
	Open3D for Tru64 UNIX on CD-ROM, includes graphics drivers	QA-OAFAA-H8

## Options

### OpenVMS

- AlphaServer ES45 OpenVMS systems include Base license with System Manager license and Enterprise Integration Server License Package for OpenVMS Revision V3.1
- Enterprise Integration Package includes licenses for TCP/IP Services for OpenVMS, DECwindows Motif for OpenVMS Alpha, DECprint Supervisor for OpenVMS Alpha Plus, DECprint Supervisor for OpenVMS Open, DECnet-Plus for OpenVMS Alpha End System, Archive/Backup System for OpenVMS Management Tools, Archive/Backup Agent for Windows NT, OpenVMS Disk Services for Windows NT, Office Server for OpenVMS, PATHWORKS 32, PATHWORKS V6 for OpenVMS – Advanced Server, and DIGITAL Office Server Client Access License
- OpenVMS Concurrent Use licenses provide the right to interactively use the operating system by the specified number of concurrent users on a designated OpenVMS system. OpenVMS Concurrent Use licenses can be moved from one system to another at user discretion and can be shared in a mixed OpenVMS VAX and OpenVMS Alpha cluster.
- OpenVMS Traditional Unlimited Use license is system specific and can only be used on one system at a time. It cannot be shared between systems or in an OpenVMS VAX or OpenVMS Alpha Cluster.

Concurrent Use 1-user license	QL-MT3AA-3B
Concurrent Use 2-user license	QL-MT3AA-3C
Concurrent Use 4-user license	QL-MT3AA-3D
Concurrent Use 8-user license	QL-MT3AA-3E
Concurrent Use 16-user license	QL-MT3AA-3F
Concurrent Use 32-user license	QL-MT3AA-3G
Concurrent Use 64-user license	QL-MT3AA-3H
Concurrent Use 128-user license	QL-MT3AA-3J
Concurrent Use 256-user license	QL-MT3AA-3K
Traditional unlimited user license	QL-MT2AE-AA
OpenVMS media and documentation on CD-ROM	QA-MT1AA-H8
OpenVMS full hard copy documentation	QA-001AA-GZ
Layered products media and documentation for OpenVMS on CD-ROM, includes Enterprise Integration Server for OpenVMS media and documentation.	QA-03XAA-H8
DECnet extended function license for OpenVMS	QL-MTGAE-AA
DECnet end-system to extended function upgrade license for OpenVMS	QL-MTHAE-AA
OpenVMS Cluster license for Alpha systems	QL-MUZAE-AA
OpenVMS Volume Shadowing license	QL-2A1AE-AA

## Step 16 - Hardware and Software Support Services for Tru64 UNIX and OpenVMS

- Select one of the optional HP Care Pack Service Packages described below that best support the customer's operational requirements for system availability.



### Options

#### HP Care Pack Services

- HP Care Pack Services are available for AlphaServer systems running Tru64 UNIX or OpenVMS operating systems. HP Care Pack Services are designed for customers who require support beyond that provided by the hardware product warranty with coverage for both Principal server systems and SSPs (Subsequent System Packages) - that meet a full range of customer support requirements.

#### Program Features

#### HP Support Plus

- HP Support Plus offers combined hardware and software services in one package, providing support during standard HP office hours.

#### HP Support Plus 24

- HP Support Plus 24 offers combined hardware and software services in one package to help enhance the availability and performance of your IT infrastructure 24x7.

#### HP Proactive 24

- HP Proactive 24 (P24) is a combined hardware and software support solution designed to help you get more from your IT investment. P24 improves the effectiveness, performance, and availability of the technologies in your IT infrastructure.

#### HP Critical Service

- HP Critical Service (CS) is a comprehensive hardware and software support solution, designed for organizations running business critical applications. CS provides a combination of proactive and reactive services for mission critical environments with little or no tolerance for downtime.

#### Installation

- Pre-installation review
- Unpacking of equipment
- Assemble and test
- Basic product usage info
- No software installation added

#### Installation & Startup HP O/S

- Pre-installation review
- Unpacking of equipment
- Assemble and test
- Basic product usage info
- Install operating systems
- Product configuration
- Print & network access
- Orientation

## Options

HP Care Pack Services for AlphaServer ES45 Systems (sold via Fusion Order Management System)				
	1-year Package ID#	Option ID#	3-year Package ID#	Option ID#
<b>AlphaServer ES45 Model 1B</b>				
HP Support Plus	HA109A1	6JL	HA109A3	6JL
HP Support Plus 24	HA110A1	6JL	HA110A3	6JL
HP Proactive 24	HA111A1	6JL	HA111A3	6JL
HP Critical Service	HA112A1	6JL	HA112A3	6JL
<b>AlphaServer ES45 Model 2B, 3B</b>				
HP Support Plus	HA109A1	6JH	HA109A3	6JH
HP Support Plus 24	HA110A1	6JH	HA110A3	6JH
HP Proactive 24	HA111A1	6JH	HA111A3	6JH
HP Critical Service	HA112A1	6JH	HA112A3	6JH

### NOTES:

- AlphaServer ES45 systems include one-year parts and labor warranty with 5x9, on-site Next Business Day response.
  - HP Care Pack Services include support for new HP branded hardware options internal to the AlphaServer enclosure plus a monitor (17-inch or less excluding flat panel models).
  - External storage devices/cabinets carry their own level of warranty and should be quoted separately for uplifted warranty services.
  - In addition to the HP Care Pack Services shown above, other service packages are available for separate hardware and software support. For more information on Hardware and Software Upfront Services and other HP service options available for AlphaServers, please consult your Sales Account Manager, HP Services Principal, or visit: <http://www.hp.com/hps/>
- NOTE:** This Web site is available in English only.

## Technical Specifications

Tower Configuration	Dimensions (H x W x D)	20 x 15.25 x 31 in (50.8 x 38.7 x 78.7 cm)		
	Shipping Dimensions	32.2 x 24 x 40 in (82.48 x 60.2 x 101.6 cm)		
	Weight	Typical Configuration	144.3 lb (65.6 kg)	
		Maximum Configuration	212.8 lb (96.7 kg)	
	Shipping Weight	Typical Configuration	172 lb (78 kg)	
		Maximum Configuration	242 lb (110 kg)	
	Clearances	<b>Operating</b>		<b>Service</b>
		Front	29.5 in (75 cm)	29.5 in (75 cm)
		Rear	6 in (15 cm)	29.5 in (75 cm)
		Left Side	None	29.5 in (75 cm)
		Right Side	None	None
Pedestal Configuration	Dimensions (H x W x D)	30.8 x 20 x 31.75 in (78.2 x 50.8 x 80.6 cm)		
	Shipping Dimensions	42.4 x 39.5 x 23.9 in (107.7 x 100.3 x 60.7 cm)		
	Weight	Typical Configuration	280 lb (127 kg)	
		Maximum Configuration	350 lb (159 kg)	
	Shipping Weight	Typical Configuration	328 lb (149 kg)	
		Maximum Configuration	407 lb (185 kg)	
	Clearances	<b>Operating</b>		<b>Service</b>
		Front	29.5 in (75 cm)	29.5 in (75 cm)
		Rear	6 in (15 cm)	29.5 in (75 cm)
		Left Side	None	None
		Right Side	None	29.5 in (75 cm)
Rackmount System	Dimensions (H x W x D)	13.87 x 17.6 x 30.1 in (35.2 x 44.7 x 76.5 cm) (fits 14 in [8U] standard RETMA cabinet)		
	Shipping Dimensions	28.8 x 24 x 40 in (73.2 x 60.7 x 101.6 cm)		
	Weight	When lifting:	Typical Configuration	110 lb (50 kg)
			Maximum	167.2 lb (76 kg)
		Total added to cabinet (brackets, slides, cables):	Total added to cabinet	130 lb (59 kg)
			Maximum	202.4 lb (92 kg)
	Shipping Weight	Nominal	158 lb (72 kg)	
		Maximum	233 lb (106 kg)	
	Clearances	Operating	Service	
		See specific cabinet requirements	Minimum 4 ft (121.9 cm), 32.4 in (82.2) cm withdrawal on rails	

## Technical Specifications

Cabinet Configuration	H9A10 M-Series	H9A15 M-Series	Series 10000 Rack (10642)
Dimensions (H x W x D)	67 x 23.6 x 41.5 in (170 x 60 x 105.4 cm)	79 x 23.6 x 41.5 in (200 x 60 x 105.4 cm)	78.7 x 24 x 39.69 in (199.9 x 60.96 x 100.82 cm)
Shipping Dimensions	73 x 36 x 48 in (185.5 x 91.5 x 122 cm)	85 x 36 x 48 in (216 x 91.5 x 122 cm)	78.7 x 24 x 39.69 in (199.9 x 60.96 x 100.82 cm)
Weight	Configuration dependent	Configuration dependent	Configuration dependent
Shipping Weight	Nominal: 946 lb (430 kg) Maximum: 1,375 lb (625 kg)	Nominal: 1,056 lb (550 kg) Maximum: 1,408 lb (640 kg)	284 lb/129 kg (empty) Maximum: 2,000 lb (909.1 kg)

## System Unit

Environmental		
Temperature	Operating (Tower, Pedestal, Rackmount)	50° to 95° F (10° to 35° C)
	Non-operating	–40° to 151° F (–40° to 66° C)
	Storage (60 days)	–40° to 151° F (–40° to 66° C)
	Rate of change	20° F/hr (11° C/hr)
	<b>NOTE:</b> Maximum operating temperature at sea level; reduce by 1.8° F (1° C) for each 2,000 ft (600 m) above sea level.	
Humidity	Operating	20% to 80%
	Non-operating	20% to 80%
	Storage (60 days)	10% to 95%
	Rate of change	20% hr
Maximum Wet Bulb Temperature	Operating	82° F (28° C)
	Storage (60 days)	115° F (46° C)
Maximum Dew Point Temperature	Operating	36° F (2° C)
Heat Dissipation	Nominal	Maximum
	Tower and Rack	980W, 3347 BTU/hr
	Pedestal	1560W, 5328 BTU/hr
	H9A10/H9A15 Cabinets	Configuration dependent
		4800 W, 16,392 BTU/hr
Air Flow and Quality	Intake location	Front
	Exhaust location	Rear Tower, Pedestal, Rack; Rear/top H9A10/H9A15
	Particle size	N/A
	Concentration	N/A
Altitude (unpressurized)	Operating	10,000 ft (3,048 m)
	Non-operating	40,000 ft (12,192 m)

## Technical Specifications

**NOTE:** Higher altitudes are possible if maximum operating temperature is reduced (see Temperature); other restrictions may apply such as maximum permissible altitude for hard drives.

**Acoustics** (Declared values per ISO 9296 and ISO 7779)

Acoustics		LWAd3B	LnAm5dBA (bystander position)
Tower or Rackmount	Idle	6.4	47
	Operating	6.4	47
Pedestal	Idle	6.6	48
	Operating	6.6	48

**NOTE:** Current values for specific configurations are available, 1 B = 10 dBA.

<b>Vibration</b>	Operating	10 to 500 Hz 0.1 G peak
	Non-operating	1.03 Grms 5-300 Hz

**Electrical** (Power supplies are universal, PFC, auto ranging, 100/240 VAC)

**Nominal Voltage (VAC)** 200 to 240

**Voltage Range (VAC)** 180 to 250  
(temporary condition)

**Power Source Phase** Single

**Nominal Frequency (Hz)** 50/60

**Frequency Range (Hz)** 47 to 53/57 to 63

<b>Maximum Inrush Current</b>	Tower and Rackmount	Single power cord	5.6A
		Multiple power cords	3.6A
		Maximum VA	1440
	Pedestal	Each power cord	8.6A
		Maximum VA	2070
	M-Series Cabinet (configuration dependent)	Nominal voltage (VAC)	200 to 240
		Each power cord	16A
		Up to 3 (Country specific)	IEC 320 to country-specific
	Pedestal (mandatory)	2 (Country specific)	IEC 320 C13 to country-specific
		3 (14 ft 10 in/52 cm)	IEC 320 C13 to IEC 320 C14
<b>Power Cords</b>	Rackmount (included)	Up to 4 (10 ft /305 cm)	200-240 V non-removable NEMA L6-20P for North America or 200-240 V non-removable IEC 309
	Cabinet (included)		

<b>Regulatory</b>	Agency Approvals	UL: Listed to UL1950 3rd edition
		UL CNL: Certified to CAN/CSA-C22.2 No. 950-1995
		TUV: EN 60950/A11:1997, GS marked

## Technical Specifications

	FCC: Part 15.B Class A
	IC ICES-003 Class A
	CE: EN55022:1998, EN55024:1998, EN61000-3-2:1995, EN61000-3-3:1995
	VCCI:V-3/97.04 Class A
	BSMI: CNS13438 Class A
	C-Tick: AS/NZS 3548:1995 Class A
Reviewed to	AS/NZ 3260:1993 Australian/New Zealand Standard
	EN 60950:2000
	IEC 60950:1999, 3rd edition
	UL 60950, 3rd edition, 2000

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